RECOGNISING GEOGRAPHIC ATROPHY

A guide to identifying and monitoring patients with geographic atrophy

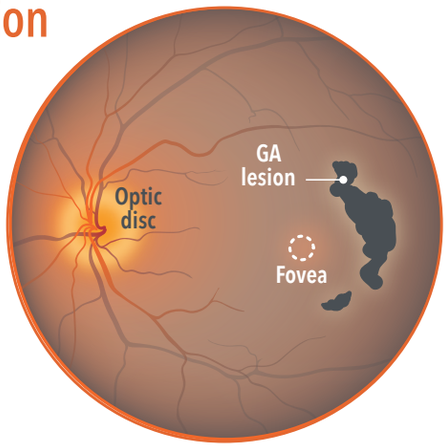
Apellis

GEOGRAPHIC ATROPHY

An advanced form of age-related macular degeneration

Geographic atrophy (GA) is an advanced form of age-related macular degeneration (AMD), a leading cause of significant vision loss worldwide.[1,2]

GA is characterised by progressive loss of the photoreceptors, retinal pigment epithelium (RPE), and underlying choriocapillaris. Regions of atrophy typically start outside the fovea and expand to involve the fovea.[2,3]



It is critical to identify GA early because the damage is progressive and associated with irreversible vision loss[2,3]

4 STEPS TO DETECTING GEOGRAPHIC ATROPHY

1. Consider risk factors & symptoms
2. Use multimodal imaging
3. Assess lesion presentation
4. Monitor for progression

AMD=age-related macular degeneration; GA=geographic atrophy; RPE=retinal pigment epithelium.

1

CONSIDER RISK FACTORS & SYMPTOMS

The pathogenesis of AMD is multifactorial, with many different genetic and environmental risk factors associated with its development and progression to more advanced forms like GA.[4]

Risk factors associated with development of AMD and/or progression to GA

Genetics

- **Family history** of AMD*[4,5]
- **Genetic predisposition*** (e.g. complement gene variants associated with increased risk)[3,4]

Physiology

- **Age** (greatest risk factor for AMD)*[5]
- Obesity[4]
- Certain dyslipidemias[4]
- Cardiovascular disease/ hypertension[4]

Lifestyle/ environment

- History of **smoking***[4,5]
- Diet[4]
- High alcohol intake[6]

Clinical factors & imaging findings

- Presence of GA in fellow eye[2]
- Drusen volume[7]
- Reticular pseudodrusen[2]

*Most significant risk factors.

Patient symptoms that may indicate GA

In the early stages of GA, visual symptoms may be minimal, as central vision is largely preserved until atrophy involves the fovea. Patients may experience some loss of peri-central, low-light vision, but it may only be noticeable under certain conditions or with designed tests. As the disease progresses, more severe deterioration in central visual acuity occurs.[3,8]

Visual symptoms[8]

- Delayed dark adaptation
- Reduced contrast sensitivity
- Dull/washed-out colours
- Scotomas (characterised by blurry and/or blind spots)

Functional symptoms[8]

- Difficulty reading, driving, working, and with daily activities outside the home
- Particular difficulty in low light
- Difficulty recognising familiar faces

AMD=age-related macular degeneration; GA=geographic atrophy.

2

USE MULTIMODAL IMAGING

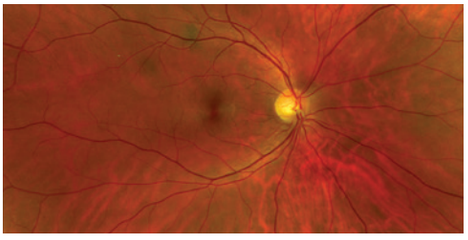
GA can be distinguished from other forms of AMD via imaging.[2,9]

IMAGING MODALITY

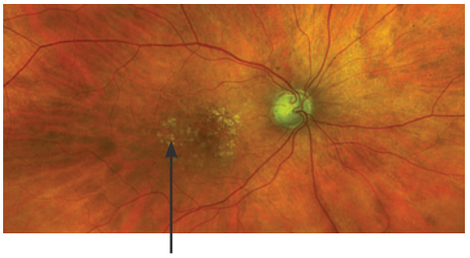
Colour fundus photography (CFP)[2,9]

- GA lesions are defined as sharply demarcated areas of RPE hypopigmentation
- Clear visibility of underlying choroidal vessels

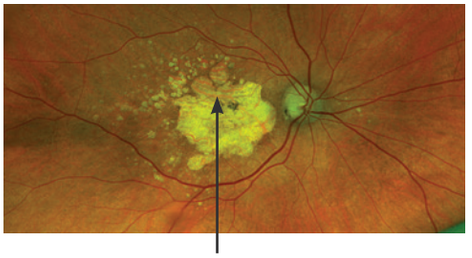
NORMAL EYE



EYES WITH GA



Choroidal vessels
Small multifocal nonsubfoveal GA

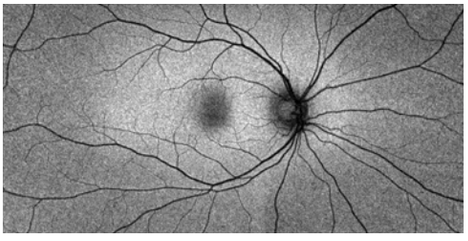


Choroidal vessels
Large multifocal subfoveal GA

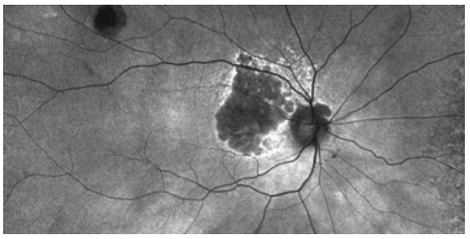
Fundus autofluorescence (FAF)[2,10]

- GA lesions appear as distinct areas of decreased hypoautofluorescence due to loss of lipofuscin-containing RPE cells
- Hyperautofluorescence around the lesion (in the junctional zone) indicates areas at high risk for atrophy

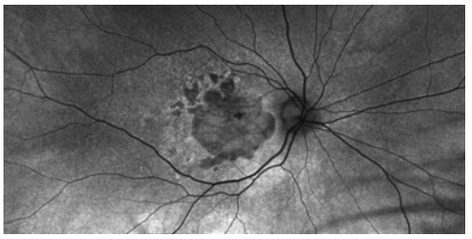
NORMAL EYE



EYES WITH GA



Medium unifocal subfoveal GA



Large multifocal subfoveal GA

FAF is the current standard imaging technology for morphological assessment of GA[10]

Images courtesy of Netan Choudhry, MD, FRCS(C), DABO, Vitreous Retina Macula Specialists of Toronto.
AMD=age-related macular degeneration; CFP=colour fundus photography; FAF=fundus autofluorescence; GA=geographic atrophy; RPE=retinal pigment epithelium.

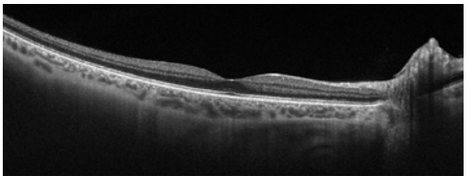
The following diagnostic imaging techniques can be used to identify GA. Each modality provides insight into different aspects of GA lesions and disease progression.[3]

IMAGING MODALITY

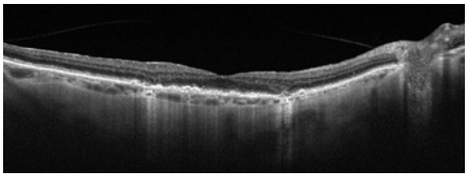
Optical coherence tomography (OCT) – structural B-scan[2,10]

- GA appears as areas of loss of the photoreceptors, RPE, and choriocapillaris
- Increased reflectivity from underlying choroid and choriocapillaris (hypertransmission)

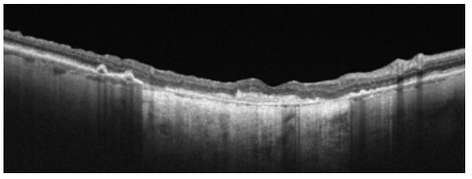
NORMAL EYE



EYES WITH GA



Small multifocal nonsubfoveal GA

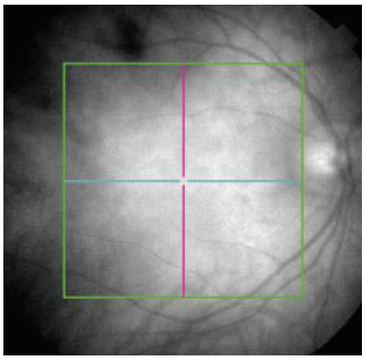


Large multifocal subfoveal GA

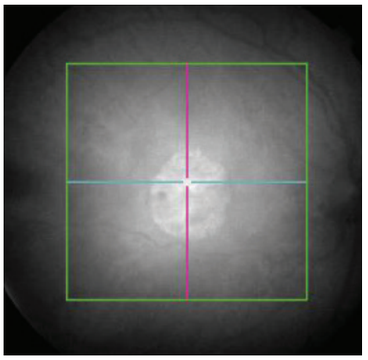
Optical coherence tomography (OCT) – *en face*[9]

- Structural B-scans can be combined with *en face* views of OCT scans to more easily identify lesion borders and measure lesion growth

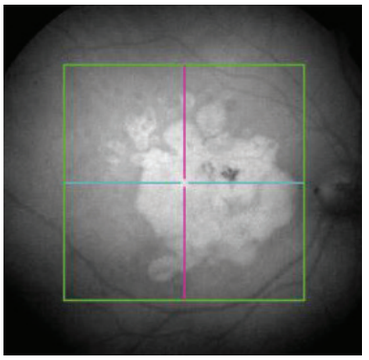
NORMAL EYE



EYES WITH GA



Medium unifocal subfoveal GA



Large multifocal subfoveal GA

The earliest diagnosis of GA can be made using OCT imaging[9]

Images courtesy of Netan Choudhry, MD, FRCS(C), DABO, Vitreous Retina Macula Specialists of Toronto.
GA=geographic atrophy; OCT=optical coherence tomography; RPE=retinal pigment epithelium.

3

ASSESS LESION PRESENTATION

GA lesions can present in several different patterns. While the rate and nature of GA progression vary considerably among individual patients, some factors have been shown to be associated with rate of progression. Awareness of specific lesion features that could predict faster GA progression is important.[2]

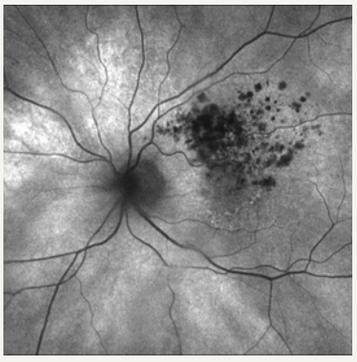
GA lesions grow at a median rate of **~1.78 mm² per year** (~0.53 to 2.6 mm² per year)[2,11–13]

Lesion features associated with rate of GA progression[2,14,15]

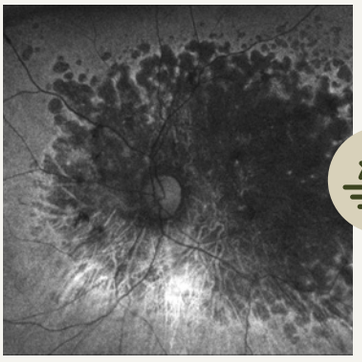
Predictors of faster GA progression

SIZE

Small

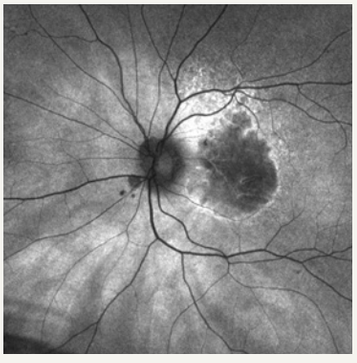


Medium/large*

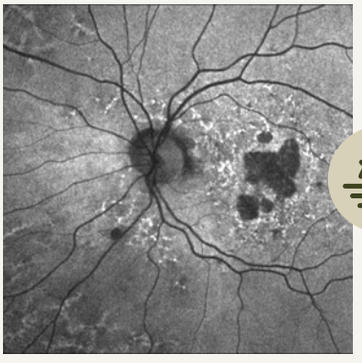


CONFIGURATION

Unifocal

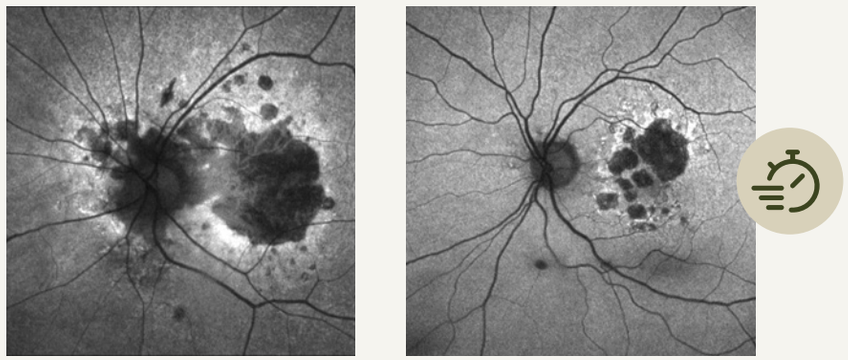


Multifocal*

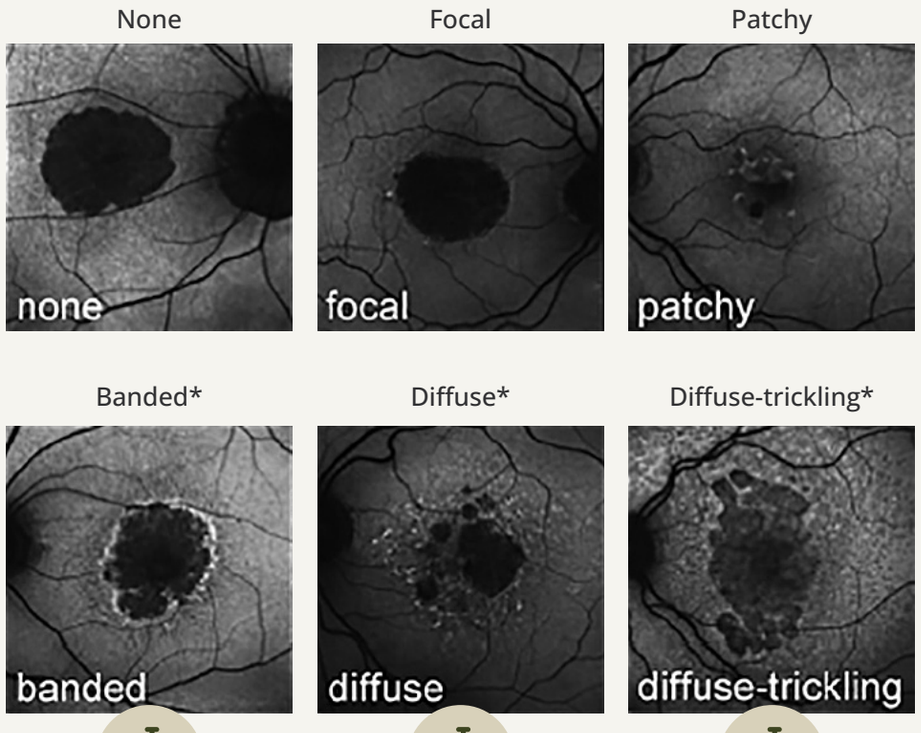


*Predictor of faster GA progression.
Images courtesy of Netan Choudhry, MD, FRCS(C), DABO, Vitreous Retina Macula Specialists of Toronto.
GA=geographic atrophy.

LOCATION



FAF PATTERN



4

MONITOR FOR PROGRESSION

Recommended monitoring schedule for patients with GA:[16,17]

- **Regular monitoring at least every 6 to 12 months** by an eye care professional
- **Consider referral to a specialist** for patients at high risk of progression

*Predictor of faster GA progression.
Images courtesy of Netan Choudhry, MD, FRCS(C), DABO, Vitreous Retina Macula Specialists of Toronto (lesion location).
Images reprinted from Fleckenstein M, *et al.* 2018 (FAF pattern). © 2018 with permission from the American Academy of Ophthalmology.
FAF=fundus autofluorescence; GA=geographic atrophy.

You play a key role in early detection and ongoing monitoring of patients with GA

DISCOVER GEOGRAPHIC ATROPHY

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Developed in collaboration with Netan Choudhry, MD, FRCS(C), DABO, co-founder and medical director of the Vitreous Retina Macula Specialists of Toronto.

GA=geographic atrophy.

References:
1. Gehrs KM, *et al. Ann Med.* 2006;38(7):450–471. **2.** Fleckenstein M, *et al. Ophthalmology.* 2018;125(3):369–390. **3.** Boyer DS, *et al. Retina.* 2017;37(5):819–835. **4.** Sobrin L, Seddon JM. *Prog Retin Eye Res.* 2014;40:1–15. **5.** Aldebert G, *et al. JAMA Ophthalmol.* 2018;136(7):770–778. **6.** Chong EWT, *et al. Am J Ophthalmol.* 2008;145(4):707–715. **7.** Nassisi M, *et al. Ophthalmology.* 2019;126(12):1667–1674. **8.** Sacconi R, *et al. Ophthalmol Ther.* 2017;6(1):69–77. **9.** Sadda SR, *et al. Ophthalmology.* 2018;125(4):537–548. **10.** Sadda SR, *et al. Retina.* 2016;36(10):1806–1822. **11.** Holekamp N, *et al. Ophthalmology.* 2020;127(6):769–783. **12.** Holz FG, *et al. JAMA Ophthalmol.* 2018;136(6):666–677. **13.** Heier JS, *et al. Ophthalmol Retina.* 2020;4(7):673–688. **14.** Holz FG, *et al. Am J Ophthalmol.* 2007;143(3):463–472. **15.** Jeong YJ, *et al. Eye (Lond).* 2014;28(2):209–218. **16.** Eye Health Council of Ontario. *Can J Optom.* 2015;77(1):1–11. **17.** Legge A. Keeping an eye on geographic atrophy. 2023. Available at: https://www.optometrytimes.com/view/keeping-an-eye-on-geographic-atrophy (Accessed October 2023).

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